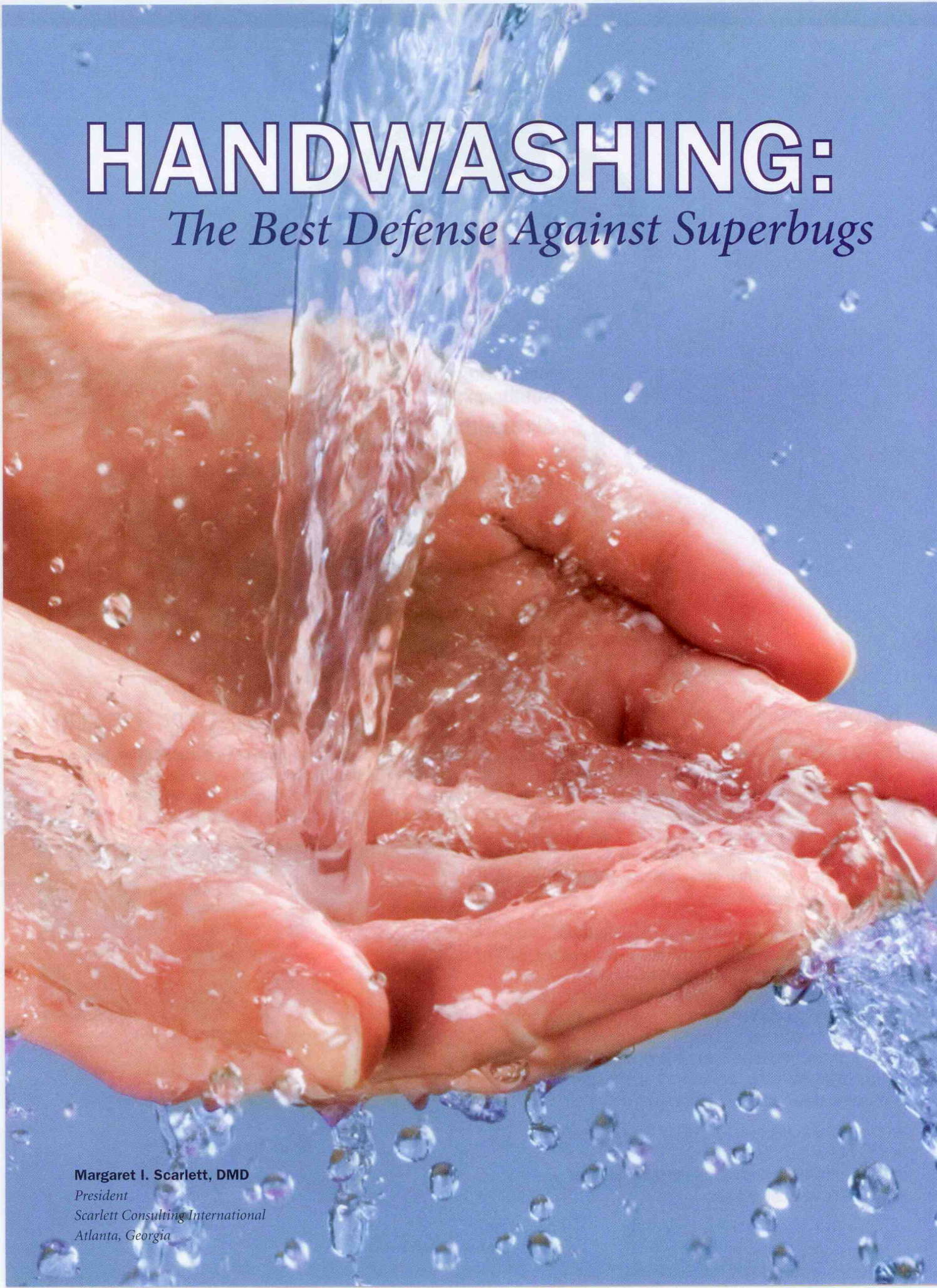
HANDWASHING:
The Best Defense Against Superbugs



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In today's world, new antibiotic-resistant bacteria are spreading not only in certain healthcare settings, but in the community as well. Every dental practice should become informed about "superbugs," especially methicillin-resistant *Staphylococcus aureus* (MRSA) and others. These resistant micro-organisms are now found in healthcare settings and, increasingly, in community settings. As with other transmissible infections, proper handwashing followed by donning protective gloves for patient care can reduce the risk of acquiring or transmitting superbugs in the dental practice. This article will discuss superbugs, realistic risks, and practice tips for handwashing to reduce the risks of transmission.

Many superbugs are present on the skin or environmental surfaces. However, if they get into the body, they can cause havoc. Superbugs are especially important to manage now that many patients who are immunocompromised or who have infectious or chronic diseases are living and working, leading normal lives, and coming into the dental practice for care. They are able to do this because of new treatment options and pharmaceutical advances. However, these immunocompromised patients are especially vulnerable to superbugs.

Although transmission of superbugs is most frequently documented in hospitals, all healthcare settings are affected by the emergence and transmission of antimicrobial-resistant microbes. A recent government report suggests awareness in ambulatory surgical centers about the risk for superbug transmission.[1] What is not yet known is the magnitude of risk for acquiring or transmitting superbugs in a dental office. Fortunately, standard infection control practices and good hand hygiene will protect dentists, staff, and patients from superbugs.[2,3]

WHAT ARE SUPERBUGS?

"Superbugs" is the term used to describe multidrug-resistant organisms that have evolved and developed resistance to at least one type of antimicrobial drug or antibiotic. Common examples of superbugs include[4]:

- MRSA: methicillin/oxacillin-resistant *Staphylococcus aureus*
- VRE: vancomycin-resistant *enterococci*
- ESBLs: extended-spectrum *beta-lactamases* (which are resistant to cephalosporins and monobactams)
- PRSP: penicillin-resistant *Streptococcus pneumoniae*

Some resistant organisms have been identified, but others remain unidentified. Examples of identified organisms include *Escherichia coli* and *Klebsiella pneumoniae*, strains of *Acinetobacter baumannii* resistant to all antimicrobial agents, organisms such as *Stenotrophomonas maltophilia*, *Burkholderia cepacia*, and *Ralstonia pickettii*. Additional organisms are emerging over time, with some yet to be identified.[5]

Because data from a sample of dental offices is not collected currently, it is not known how prevalent these superbugs are in the dental setting. However, since the early 1990s, the prevalence of superbugs has jumped in other healthcare facilities. In general, MRSA and VRE are most commonly found among patients who reside in long-term healthcare facilities, such as nursing homes.[4] PRSP infections are more commonly found among patients seeking care in outpatient settings such as physicians' offices and clinics, especially children's clinics.[4] By extrapolation, PRSP could reasonably be expected to be found in the dental office, especially offices that treat many children.

Management of superbug or multidrug resistant organisms (MDRO) can be complex and individualized in hospital settings. The Healthcare Infection Control Practices Advisory Committee of the Centers for Disease Control and Prevention (CDC) has produced a lengthy document that addresses the implementation of strategies and practices to prevent transmission of some superbugs.[5] These include standard infection control practices, which should be implemented, evaluated, and monitored routinely. Special contact practices are also outlined in the document. In addition to standard precautions, these special precautions include:

- special patient placement, such as in single patient rooms.
- donning gloves before touching skin, surfaces, or articles in close proximity to the patient and upon entry into the examination room or cubicle.
- gowning upon entry into the examination room or cubicle. Removal of the gown and hand hygiene should occur before leaving the patient-care area. Take care to remove the gown so that other surfaces or clothing do not touch the gown as it is removed.
- patient transport to ensure that infected or colonized areas of the patient's body are contained and covered.
- patient-care equipment and instruments/devices should be disposable where possible. This includes disposable, non-critical patient-care equipment (eg, blood pressure cuffs) or implementation of patient-dedicated use of such equipment. If this is unavoidable, clean and disinfect such equipment before use on another patient.
- environmental measures, such as cleaning and disinfection of surfaces in the immediate vicinity of the patient.

The prevalence of superbugs varies by time, geography, and healthcare setting. For example, VRE emerged in

the eastern United States in the early 1990s, but did not appear in the western United States until several years later.[1] Check with your local or state health department for prevalence by state or if there is reason to suspect that a patient has contracted or has been exposed to a superbug.

Data about the extent of any healthcare-associated infection, including infection with superbugs, is nearly non-existent. However, hospital dental practices are monitored as part of the CDC's National Healthcare Safety Network. This system collects standardized data on healthcare associated infection (HAI) outcomes in hospitals and other healthcare facilities. Lapses in infection control, such as hand hygiene, have been shown to result in HAIs by a number of measures.[1] Previously published studies have not included analysis of HAIs or any data about superbugs from these surveys to date, only needlestick injuries.[6] So even though the extent of HAIs is not known within dental offices, handwashing remains a key component to controlling superbugs.

SIGNS AND SYMPTOMS OF SUPERBUGS

MRSA is a potentially dangerous type of staph bacteria that is resistant to certain antibiotics and may cause skin and other infections. MRSA is spread through direct contact with an infected person or by sharing personal items, such as towels or razors, that have had contact with infected skin.

Most staph skin infections, including MRSA, appear as a bump or infected area on the skin that may be red, swollen, painful, warm to the touch, full of pus or other drainage, and/or accompanied by a fever.[7]

MRSA can live harmlessly on the skin, like other forms of *S aureus*. Recent studies point to the fact that there is regional variation in the presence of community-acquired rather than hospital-acquired MRSA. Another superbug is *Clostridium difficile*, which causes diarrhea. Both of these have been identified in healthcare settings and can result in negative consequences for patients, particularly those who are immunocompromised.

Enterococci are bacteria that are normally present in human intestines and in the female genital tract and are often found in the environment. These bacteria can sometimes cause infections. Vancomycin, an antibiotic, can actually cause *enterococci* to become resistant to it. While most VRE infections occur in hospitals, there is a potential for occurrence in outpatient settings, such as the dental office.[1] ESBLs are enzymes that mediate resistance to extended-spectrum (third-generation) cephalosporins (eg, ceftazidime, cefotaxime, and ceftriaxone) and monobactams (eg, aztreonam) but do not affect cephamycins (eg, cefoxitin and cefotetan) or carbapenems (eg, meropenem or imipenem). Finally, PRSP is another superbug of concern for all outpatient settings, including dental offices.[1]

RISK FACTORS FOR TRANSMITTING SUPERBUGS IN THE DENTAL OFFICE

Just because a microorganism is present in a person does not mean that the person is infected. Colonization means that the organism is present in or on the body but is not causing illness, while infection is the presence of an organism that causes illness. Risk factors for both colonization and infection vary, but are impacted by the following:

- severity and type of illness.
- prior exposure to antimicrobial agents.
- presence of other diseases or conditions, including chronic renal disease, insulin-dependent diabetes mellitus, peripheral vascular disease, dermatitis, or skin lesions.
- invasive procedures, including dialysis, invasive devices, and urinary catheterization.
- repeat visits to the healthcare system.
- prior colonization by a multidrug-resistant organism.
- being elderly.

In the medical history, be sure to ask whether a patient has been exposed to or has had a superbug. When asking your patients about known exposure or a recent history of superbugs, be aware that some patients may not know about exposure. In general, family caregivers of infected persons are advised to notify doctors and other healthcare personnel if the patient is colonized or infected with a multidrug-resistant organism. If you get a positive response, understand that persons with MRSA, VRE, and other infections may be protected by the Americans with Disabilities Act or other applicable state or local laws or regulations.[8]

CONTROLLING TRANSMISSION OF SUPERBUGS IN THE DENTAL PRACTICE

The CDC publishes recommendations for preventing the transmission of any superbugs, calling for universal

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precautions to be used in all patient care.[9] In the case of special outbreaks of disease that the CDC monitors, or new or emerging organisms of interest, the CDC recommends contact precautions based on national or local regulations. These would not be expected to be seen in a dental office, except in rare cases before a disease outbreak is known.[5]

HANDWASHING KEY TO PREVENTING TRANSMISSION

Good hand hygiene, especially proper handwashing, is the most important step in preventing superbugs. Proper handwashing is a simple, key infection-control step in your dental office. Handwashing should be done[10]:

- immediately before touching a patient, performing an invasive procedure, or manipulating an invasive device.
- immediately after touching a patient or contaminated items or surfaces.
- immediately after removing gloves.
- after touching items or surfaces in the immediate patient care environment, even if the patient was not touched.

For routine dental procedures, remove any visible contamination and using plain or antimicrobial soap and water, wash hands thoroughly for 20 seconds, including under the fingernails. If the hands are not visibly soiled, an alcohol-based hand rub is adequate, and the rub should contain at least 60% alcohol. Handwashing should be done before and after treating every patient.[10] Antiseptic handwashing can eliminate any transient microorganisms and prevent the introduction of organisms into a surgical site if gloves become punctured or torn. There are a number of excellent antiseptic handwashing products from which to choose. However, it is most important that products do not irritate or dry the skin on hands. Hand lotions can soften or reduce the impact of frequent handwashing to prevent dryness or chapping.

TIPS ON HANDWASHING

Should hands come in contact with a potentially contaminated surface, be sure to wash them following the recommended guidelines. Contaminated surfaces include those that may contain or be contaminated by a patient's blood, saliva, or other fluids. Remember that skin bacteria multiply under gloves if hands are washed with non-antimicrobial soap. These can colonize on the hands in the moist environment underneath gloves. Alcohol-based hand rubs are rapidly germicidal when applied to the skin. They should include antiseptics (eg, chlorhexidine, quaternary ammonium compounds, octenidine, or triclosan) to achieve persistent activity. The CDC's 2002 guideline on hand hygiene in healthcare settings provides more complete information.[11]

CONCLUSION

Today, superbugs are a reality that must be addressed in the dental practice. Practicing standard infection control with good handwashing techniques and properly wearing personal protective equipment is necessary for ensuring protection from superbugs. Every practice should review their infection control practices and monitor these routinely to ensure the safety of staff and patients.

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